

Red Hat Consulting



PRODERJ: As-Built: OpenShift Service Mesh *ambiente não produtivo*

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Prefácio

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Documentos Relacionados

Esta documentação faz referências à informações disponíveis no site de Documentação Oficial da Red Hat, nos endereços:

- Openshift Container Platform

https://access.redhat.com/documentation/en-us/openshift_container_platform/4.9

- Documentação do Service Mesh

https://access.redhat.com/documentation/en-us/openshift_container_platform/4.9/html/service_mesh/index

Treinamentos Sugeridos

Baseado na infraestrutura a ser implantada, os treinamentos listados a seguir ou equivalentes são recomendados:

- Deploying Containerized Applications Technical Overview - Gratuito (DO080)
- Red Hat OpenShift I: Containers & Kubernetes (DO180)
- Red Hat OpenShift Administration II: Operating a Production Kubernetes Cluster (DO280)
- Red Hat OpenShift Development II: Containerizing Applications (DO288)
- Red Hat Cloud-native Microservices Development with Quarkus (DO378)
- Building Resilient Microservices with Istio and Red Hat OpenShift Service Mesh (DO328)

Histórico do Documento

Versão	Data	Responsável	Descrição
1.0	07/04/22	João Pontes	Versão inicial

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Termos e acrônimos

A tabela abaixo provê o glossário dos termos e acrônimos usados dentro do documento.

Acronym	Description
RH	Red Hat, Inc
TLS	Transport Layer Security
mTLS	Mutual TLS
DNS	Domain Name System
OSSM	OpenShift Service Mesh
API	Application Programming Interface

As-Built

Introdução

Este documento descreve a configuração do Red Hat Service Mesh no ambiente não produtivo, já instalado, do Red Hat Openshift.

Objetivos

- Introduzir de forma prática (hands-on) a configuração do OpenShift Service Mesh
- Demonstrar como as aplicações devem ser codificadas para geração dos dados necessários para 'Observability'
- Implantar as aplicações de exemplo no OpenShift Container Platform e por fim, mostrar como as métricas coletadas são representadas nas ferramentas Jaeger, Kiali, Prometheus, e Grafana

Pré-requisitos

- Subscrição ativa do OpenShift Container Platform em sua conta Red Hat.
- Instalação do OpenShift Container Platform 4.9.
- Para execução da instalação é necessário ter um usuário com acesso aos clusters como cluster-admin. Também é necessário acesso ao bastion com acesso aos clusters.
- Conta no <https://github.com>
- helm : <https://helm.sh/docs/intro/install/>
- git: <https://github.com/git-guides/install-git>

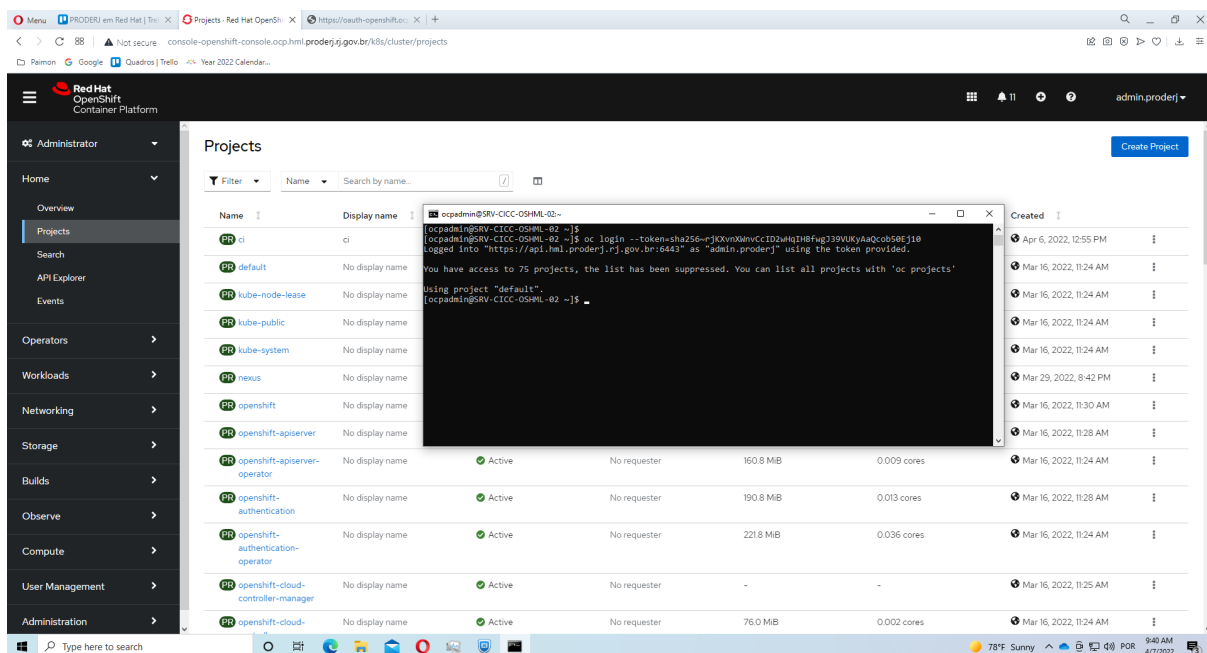
Instalação do Service Mesh

Para facilitar a gerenciamento do Service Mesh, cria-se dos projetos:

- proderj-dit-infra-ossm (centraliza as configurações do service-mesh)
- proderj-dss-apps (agrupa os aplicativos)

1. Login no Openshift via CLI

```
oc login -u user_x -p password_x https://openshift.host_x.api
```

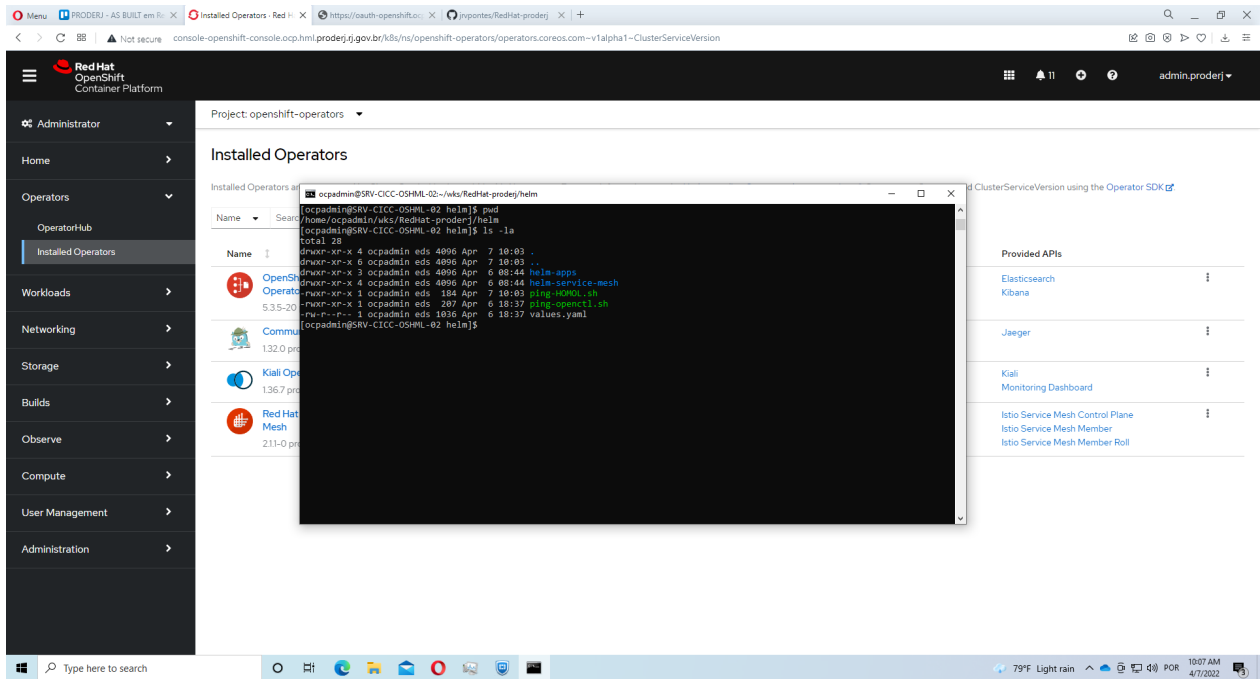


The screenshot shows the Red Hat OpenShift Container Platform console. The left sidebar contains navigation links: Administrator, Home, Overview, Projects (selected), Search, API Explorer, Events, Operators, Workloads, Networking, Storage, Builds, Observe, Compute, User Management, and Administration. The main content area displays the 'Projects' page with a table of projects. A terminal window is overlaid on the console, showing the command 'oc login' and its output, which includes a token and a message about project access.

Name	Display name	Created
ci		Apr 6, 2022, 12:55 PM
default	No display name	Mar 16, 2022, 11:24 AM
kube-node-lease	No display name	Mar 16, 2022, 11:24 AM
kube-public	No display name	Mar 16, 2022, 11:24 AM
kube-system	No display name	Mar 16, 2022, 11:24 AM
nexus	No display name	Mar 29, 2022, 8:42 PM
openshift	No display name	Mar 16, 2022, 11:30 AM
openshift-apserver	No display name	Mar 16, 2022, 11:28 AM
openshift-apserver-operator	No display name	Mar 16, 2022, 11:24 AM
openshift-authentication	No display name	Mar 16, 2022, 11:28 AM
openshift-authentication-operator	No display name	Mar 16, 2022, 11:24 AM
openshift-cloud-controller-manager	No display name	Mar 16, 2022, 11:25 AM
openshift-cloud-	No display name	Mar 16, 2022, 11:24 AM

2. Preparar Área de trabalho:

```
clone https://github.com/jrvpontos/RedHat-proderj  
cd RedHat-proderj/helm/
```

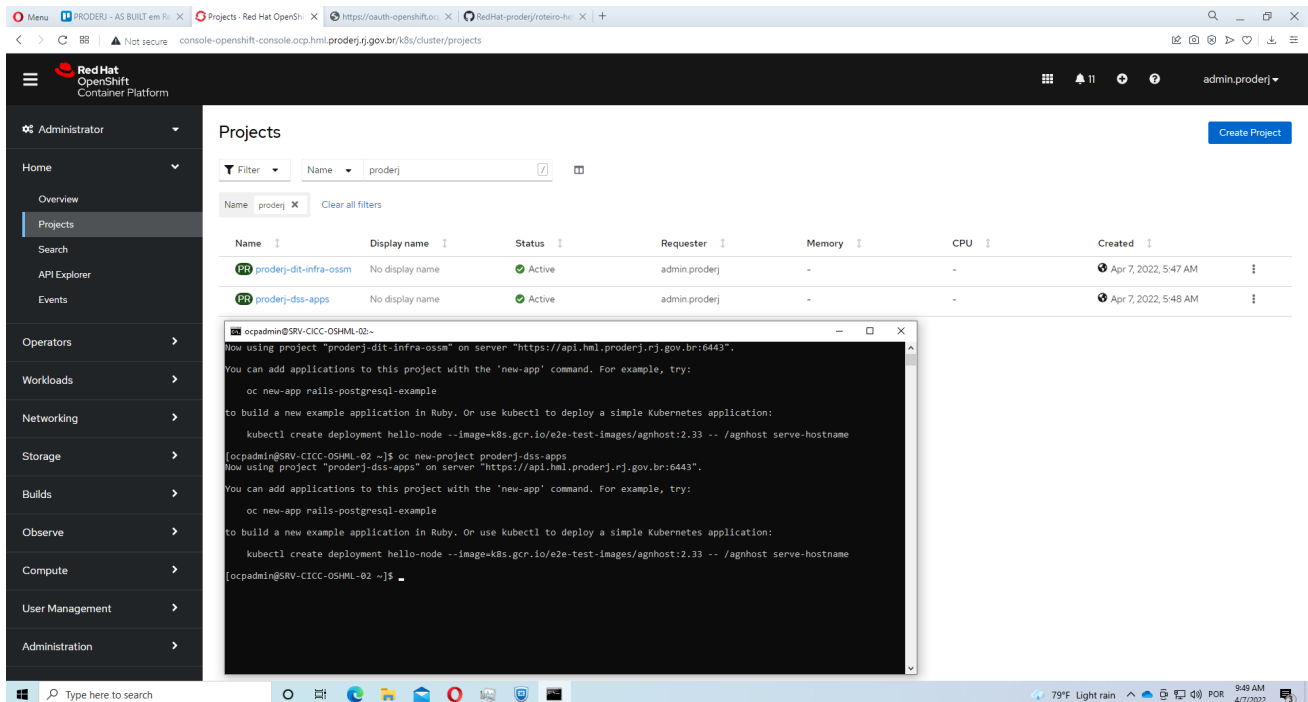


The screenshot shows the Red Hat OpenShift Container Platform console. The 'Installed Operators' page is active, displaying a table of installed operators. A terminal window is overlaid on the page, showing the output of the 'helm ls' command. The terminal output lists several Helm releases, including 'helm-apps', 'helm-service-mesh', 'ping-openshift.sh', and 'values.yaml'. The console interface includes a sidebar with navigation options like 'Administrator', 'Home', 'Operators', 'Workloads', 'Networking', 'Storage', 'Builds', 'Observe', 'Compute', 'User Management', and 'Administration'. The main content area shows the 'Installed Operators' table with columns for Name, Search, and a list of operators.

Importante: para o sucesso das linhas de comando, é mandatório que o diretório corrente seja o **helm**.

3. Criando projetos via oc (openshift-client):

```
oc new-project proderj-dit-infra-ossm  
oc new-project proderj-dss-apps
```



The screenshot displays the Red Hat OpenShift console interface. On the left, a sidebar menu shows navigation options like Administrator, Home, Overview, Projects, Search, API Explorer, Events, Operators, Workloads, Networking, Storage, Builds, Observe, Compute, User Management, and Administration. The main content area is titled 'Projects' and shows a table of active projects. Two projects are listed: 'proderj-dit-infra-ossm' and 'proderj-dss-apps', both with a status of 'Active' and created on April 7, 2022. A terminal window is open in the foreground, showing the execution of 'oc new-project' commands and instructions on how to add applications to the projects.

Name	Display name	Status	Requester	Memory	CPU	Created
proderj-dit-infra-ossm	No display name	Active	admin:proderj	-	-	Apr 7, 2022, 5:47 AM
proderj-dss-apps	No display name	Active	admin:proderj	-	-	Apr 7, 2022, 5:48 AM

```
ocpadm@SRV-CICC-OSHML-02-~  
Now using project "proderj-dit-infra-ossm" on server "https://api.hml.proderj.rj.gov.br:6443".  
You can add applications to this project with the 'new-app' command. For example, try:  
oc new-app rails-postgresql-example  
to build a new example application in Ruby. Or use kubectl to deploy a simple Kubernetes application:  
kubectl create deployment hello-node --image=k8s.gcr.io/e2e-test-images/agnhost:2.33 -- /agnhost serve-hostname  
[ocpadm@SRV-CICC-OSHML-02 ~]$ oc new-project proderj-dss-apps  
Now using project "proderj-dss-apps" on server "https://api.hml.proderj.rj.gov.br:6443".  
You can add applications to this project with the 'new-app' command. For example, try:  
oc new-app rails-postgresql-example  
to build a new example application in Ruby. Or use kubectl to deploy a simple Kubernetes application:  
kubectl create deployment hello-node --image=k8s.gcr.io/e2e-test-images/agnhost:2.33 -- /agnhost serve-hostname  
[ocpadm@SRV-CICC-OSHML-02 ~]$
```

Configuração dos Operators

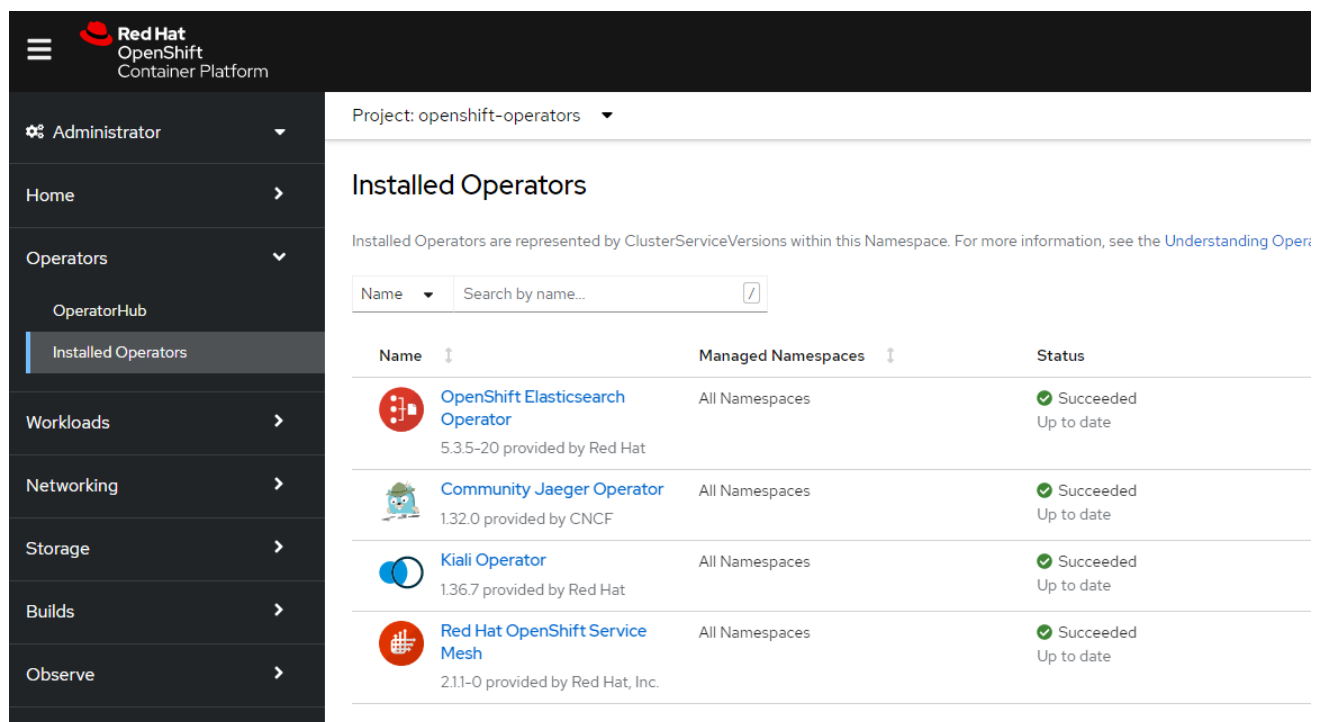
Nos próximos itens deste documento, segue a descrição de como configurar estes "operators" via linha de comando





O Service Mesh é composto por 4(quatro) "operators-kubernetes", sendo eles:

- Elastic Search
- Kiali
- Jaeger
- Service Mesh

Estes operators, já estão na instalação corrente, e agrupados no namespace: openshift-operators

Acessar: web-console >> Operators >> Installed Operators >> openshift-operators



Name	Managed Namespaces	Status
 OpenShift Elasticsearch Operator 5.3.5-20 provided by Red Hat	All Namespaces	✓ Succeeded Up to date
 Community Jaeger Operator 1.32.0 provided by CNCF	All Namespaces	✓ Succeeded Up to date
 Kiali Operator 1.36.7 provided by Red Hat	All Namespaces	✓ Succeeded Up to date
 Red Hat OpenShift Service Mesh 2.11-0 provided by Red Hat, Inc.	All Namespaces	✓ Succeeded Up to date

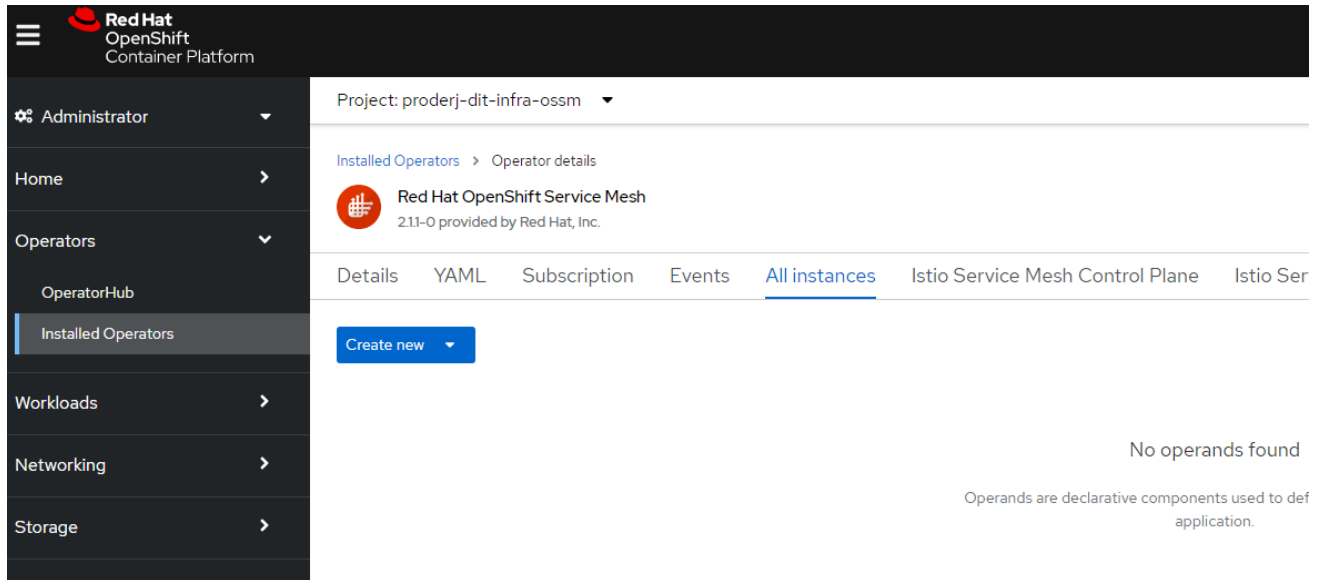
Para uma eventual instalação dos operators, executar:

```
helm install -f values.yaml -n proderj-dit-infra-oss  
proderj-dit-infra-oss-operator helm-service-mesh/helm-0-operator/
```

Configurando do Service Mesh

Como informado anteriormente, a configuração do Service Mesh deve ficar centralizada no projeto `proderj-dit-infra-ossm`.

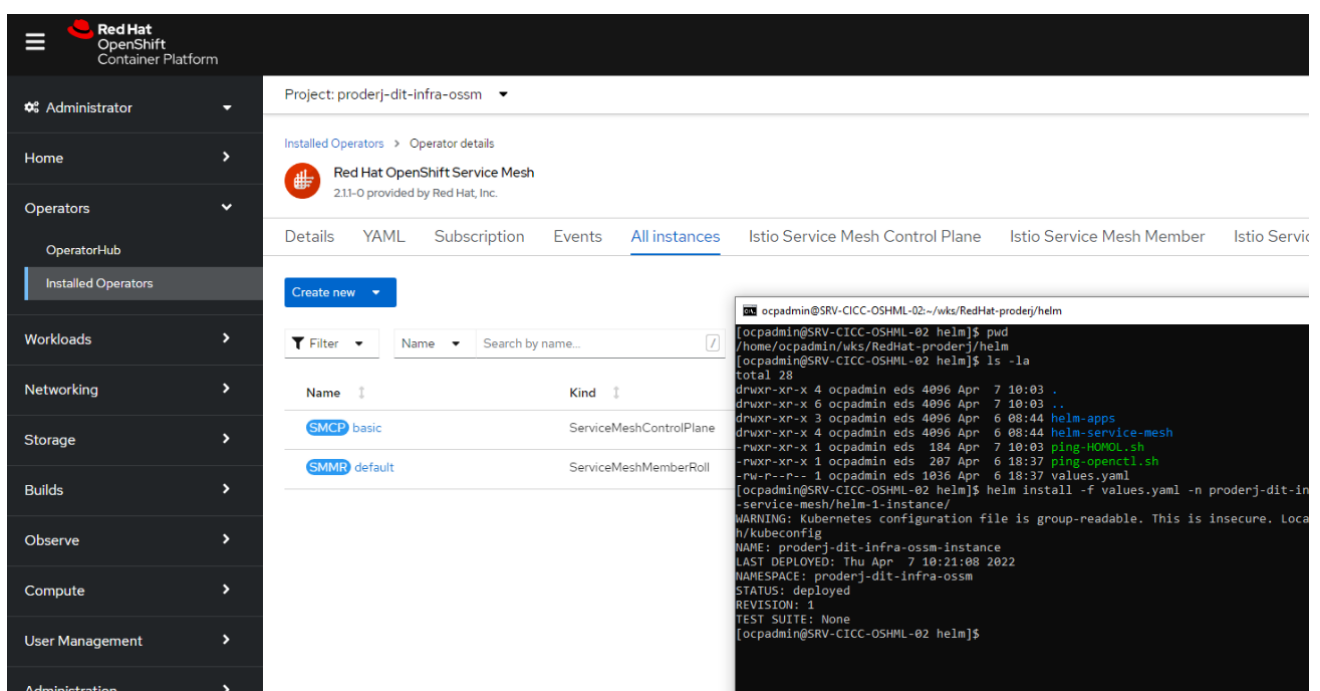
Acessar : `web-console >> Operators >> Installed Operators >> proderj-dit-infra-ossm >> Red Hat OpenShift Service Mesh >> All Instances`



Executar:

```
helm install -f values.yaml -n proderj-dit-infra-ossm
proderj-dit-infra-ossm-instance helm-service-mesh/helm-1-instance/
```

Resultado:




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Verificando instalação do Service Mesh.
Acessar:

web-console >> Operators >> Installed Operators >> proderj-dit-infra-ossm >> Red Hat OpenShift Service Mesh >> All Instances >> Basic >> Conditions



Administrator

Home

Operators

OperatorHub

Installed Operators

Workloads

Networking

Storage

Builds

Observe

Compute

User Management

Administration

Project: proderj-dit-infra-ossm

Install Kiali

☒ True

Install Grafana

☒ True

Jaeger Storage Type

Memory

Install 3Scale Adapter

☐ False

Policy

Type of Policy

Istiod

Telemetry

Type of Telemetry

Istiod

Runtime

Default Resource Req

Resource limits

CPU: None, Memory: None

Resource requests

CPU: None, Memory: None

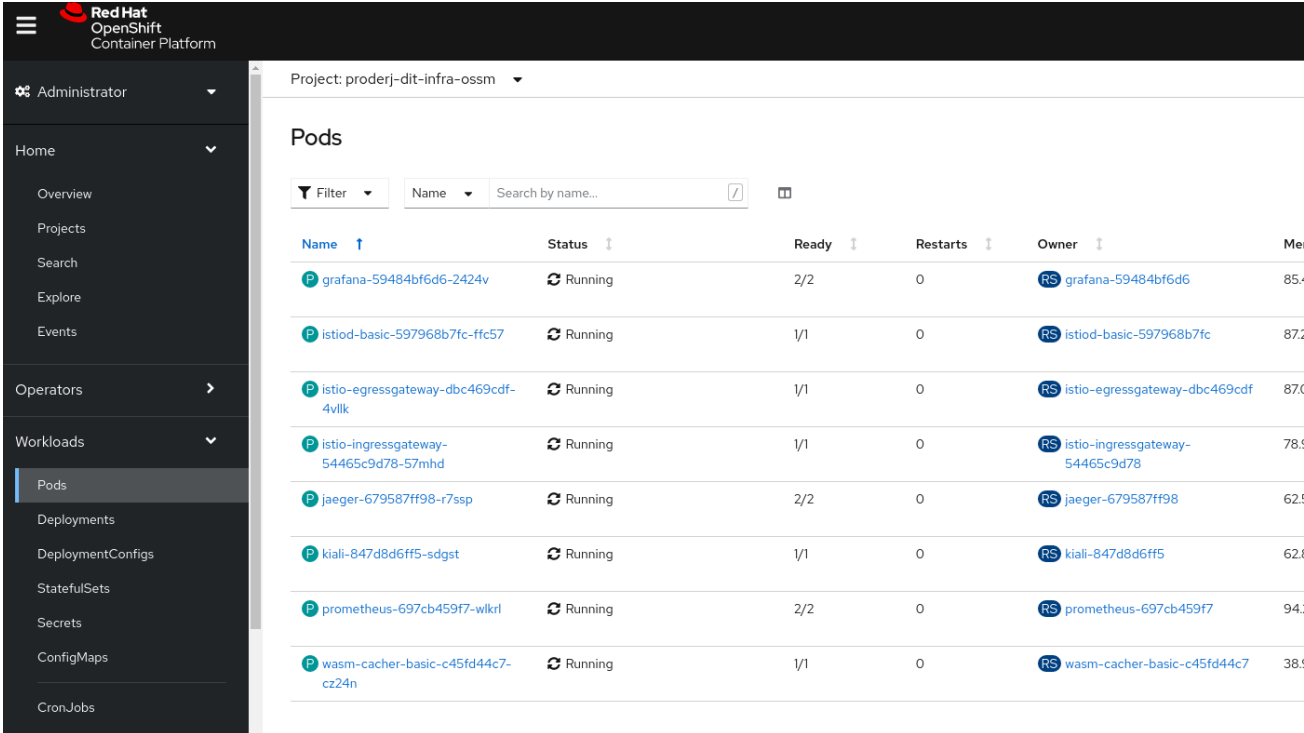
Conditions

Type	Status	Updated	Reason
Installed	True	Apr 7, 2022, 6:21 AM	InstallSuccessful
Reconciled	True	Apr 7, 2022, 6:21 AM	InstallSuccessful
Ready	True	Apr 7, 2022, 6:21 AM	ComponentsReady

Verificando se os aplicativos de 'observabilidade' estão em execução.

Acessar:

web-console >> Workloads >> Pods >> proderj-dit-infra-ossm



Project: proderj-dit-infra-ossm

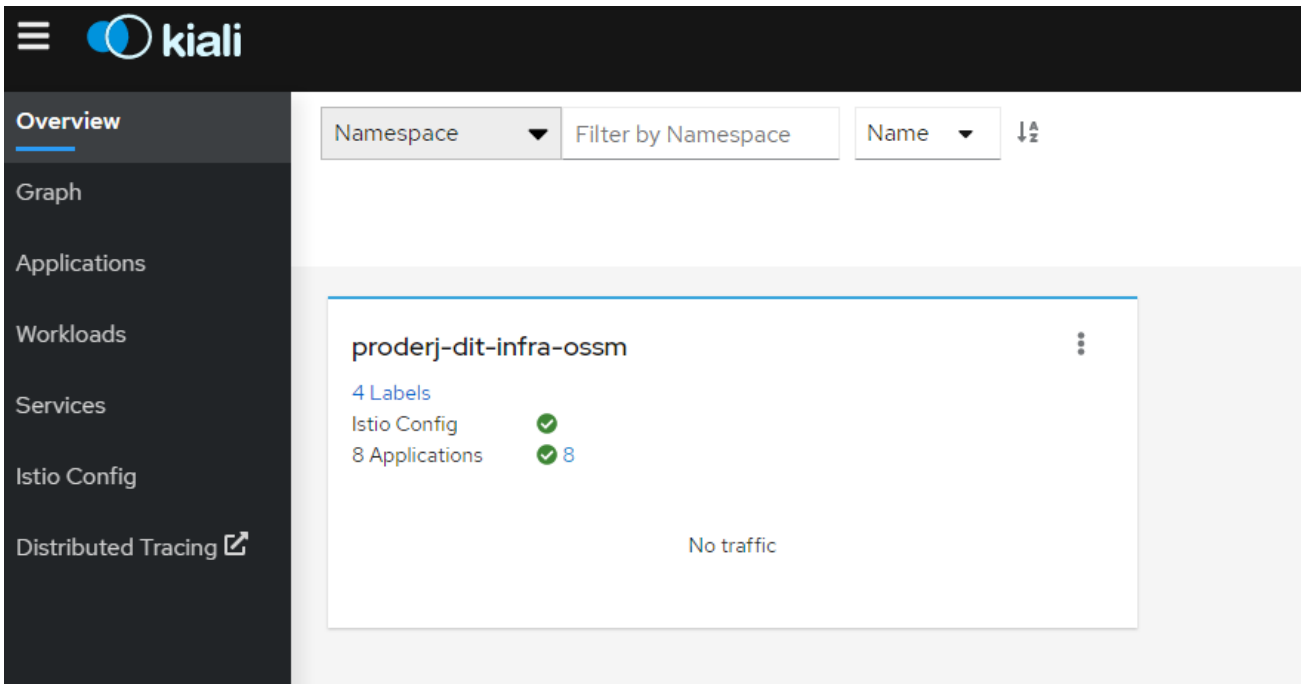
Pods

Filter Name Search by name...

Name	Status	Ready	Restarts	Owner	Me
grafana-59484bf6d6-2424v	Running	2/2	0	grafana-59484bf6d6	85.4
istiod-basic-597968b7fc-ffc57	Running	1/1	0	istiod-basic-597968b7fc	87.2
istio-egressgateway-dbc469cdf-4vllk	Running	1/1	0	istio-egressgateway-dbc469cdf	87.0
istio-ingressgateway-54465c9d78-57mhd	Running	1/1	0	istio-ingressgateway-54465c9d78	78.5
jaeger-679587ff98-r7ssp	Running	2/2	0	jaeger-679587ff98	62.5
kiali-847d8d6ff5-sdgst	Running	1/1	0	kiali-847d8d6ff5	62.8
prometheus-697cb459f7-wkrl	Running	2/2	0	prometheus-697cb459f7	94.1
wasm-cacher-basic-c45fd44c7-cz24n	Running	1/1	0	wasm-cacher-basic-c45fd44c7	38.5

Acessar:

web-console >> Networking >> Routes >> proderj-dit-infra-ossm >> Location >> Kiali



Overview

Graph

Applications

Workloads

Services

Istio Config

Distributed Tracing

Namespace Filter by Namespace Name

proderj-dit-infra-ossm

4 Labels

Istio Config ✓

8 Applications ✓ 8

No traffic

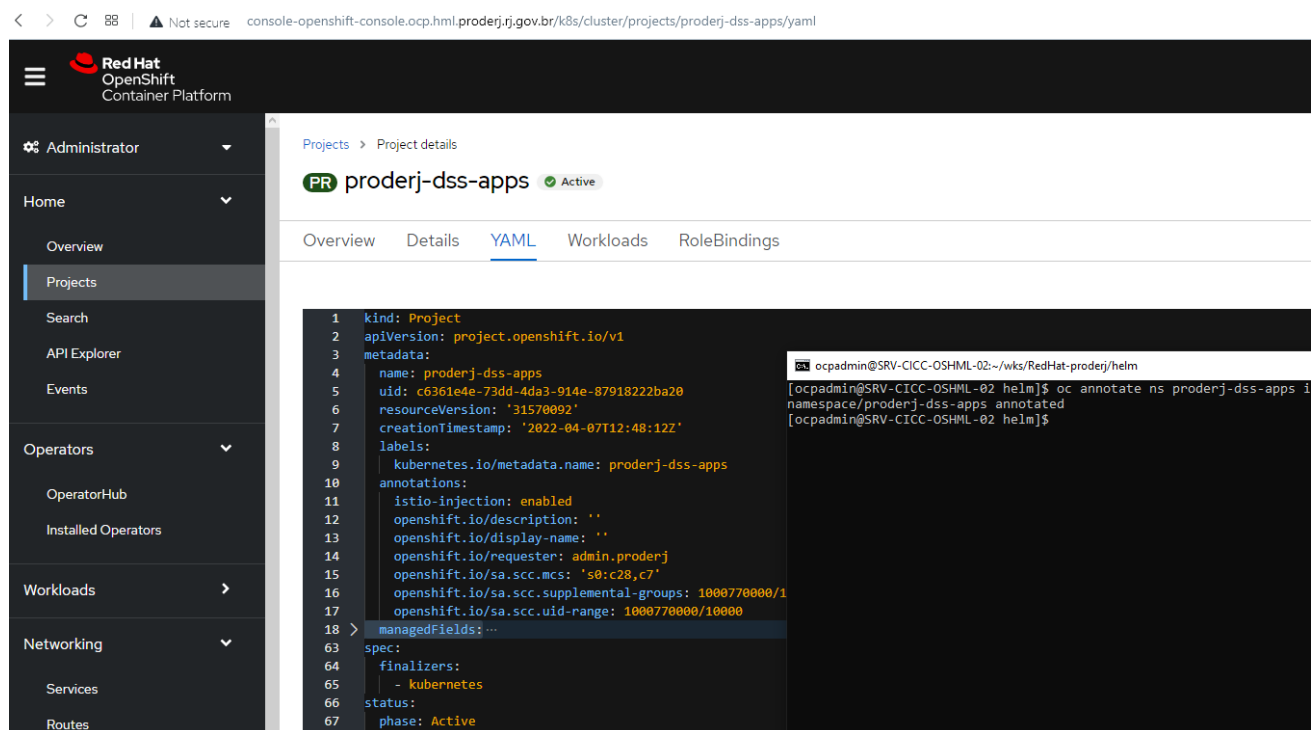
Instalando aplicações de exemplo

As aplicações estão agrupadas (namespace) no projeto proderj-dss-apps. **Os projetos observáveis devem ser devidamente configurados.** Esta configuração é feita via 'annotation'.

Executar:

```
oc annotate ns proderj-dss-apps istio-injection=enabled
```

Acessar: web-console >> Home >> Projects >> proderj-dss-apps >> YAML



The screenshot shows the Red Hat OpenShift Container Platform web console. The left sidebar contains navigation links: Administrator, Home, Overview, Projects (selected), Search, API Explorer, Events, Operators, OperatorHub, Installed Operators, Workloads, Networking, Services, and Routes. The main content area displays the 'Project details' for 'proderj-dss-apps', which is marked as 'Active'. The 'YAML' tab is selected, showing the project's configuration. The YAML content is as follows:

```
1 kind: Project
2 apiVersion: project.openshift.io/v1
3 metadata:
4   name: proderj-dss-apps
5   uid: c6361e4e-73dd-4da3-914e-87918222ba20
6   resourceVersion: '31570092'
7   creationTimestamp: '2022-04-07T12:48:12Z'
8   labels:
9     kubernetes.io/metadata.name: proderj-dss-apps
10  annotations:
11    istio-injection: enabled
12    openshift.io/description: ''
13    openshift.io/display-name: ''
14    openshift.io/requester: admin.proderj
15    openshift.io/sa.scc.mcs: 's0:c28,c7'
16    openshift.io/sa.scc.supplemental-groups: 1000770000/1
17    openshift.io/sa.scc.uid-range: 1000770000/10000
18  managedFields: ...
63 spec:
64   finalizers:
65     - kubernetes
66 status:
67   phase: Active
```

On the right side of the console, a terminal window shows the command execution:

```
ocpadmin@SRV-CICC-OSHML-02:~/wks/RedHat-proderj/helm
[ocpadmin@SRV-CICC-OSHML-02 helm]$ oc annotate ns proderj-dss-apps i
namespace/proderj-dss-apps annotated
[ocpadmin@SRV-CICC-OSHML-02 helm]$
```

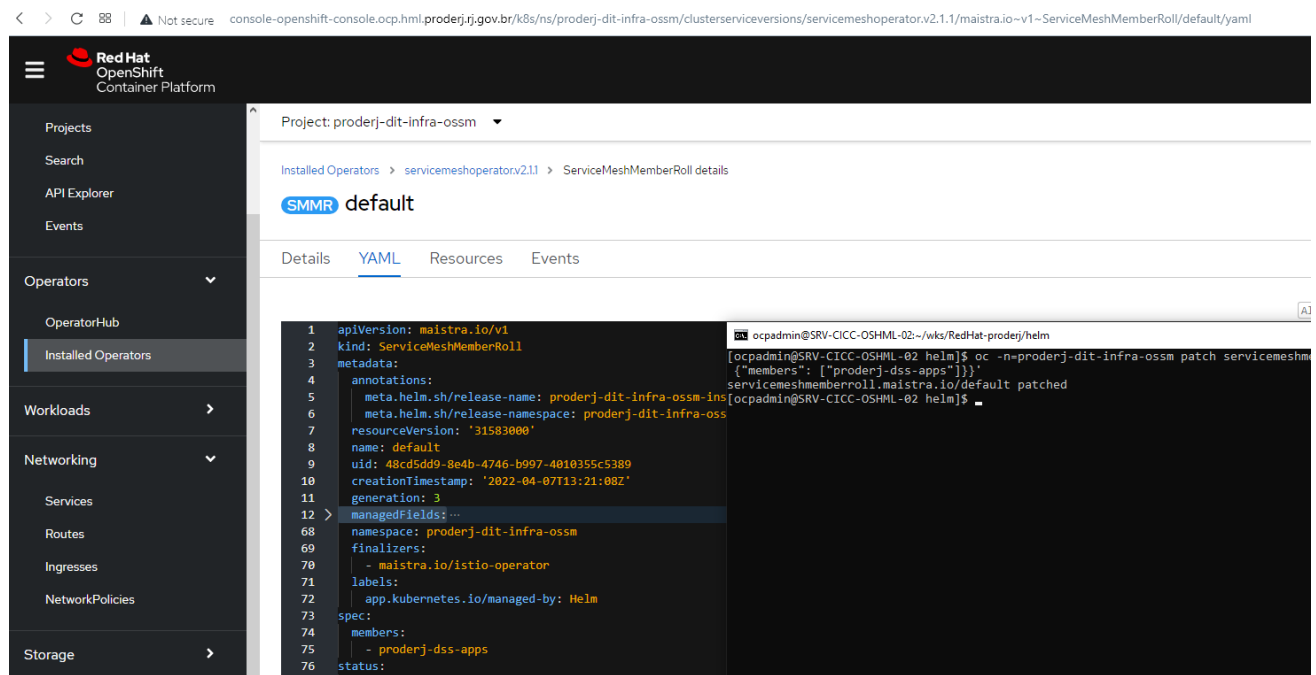
Notificar o service-mesh que um projeto vai ser 'observado'

Executar:

```
oc -n=proderj-dit-infra-ossm patch servicemeshmemberroll/default --type=merge -p '{"spec": {"members": ["proderj-dss-apps"]}}'
```

Acessar:

web-console >> Operators >> Installed Operators >> proderj-dit-infra-ossm >> Red Hat OpenShift Service Mesh >> All Instances >> default >> YAML



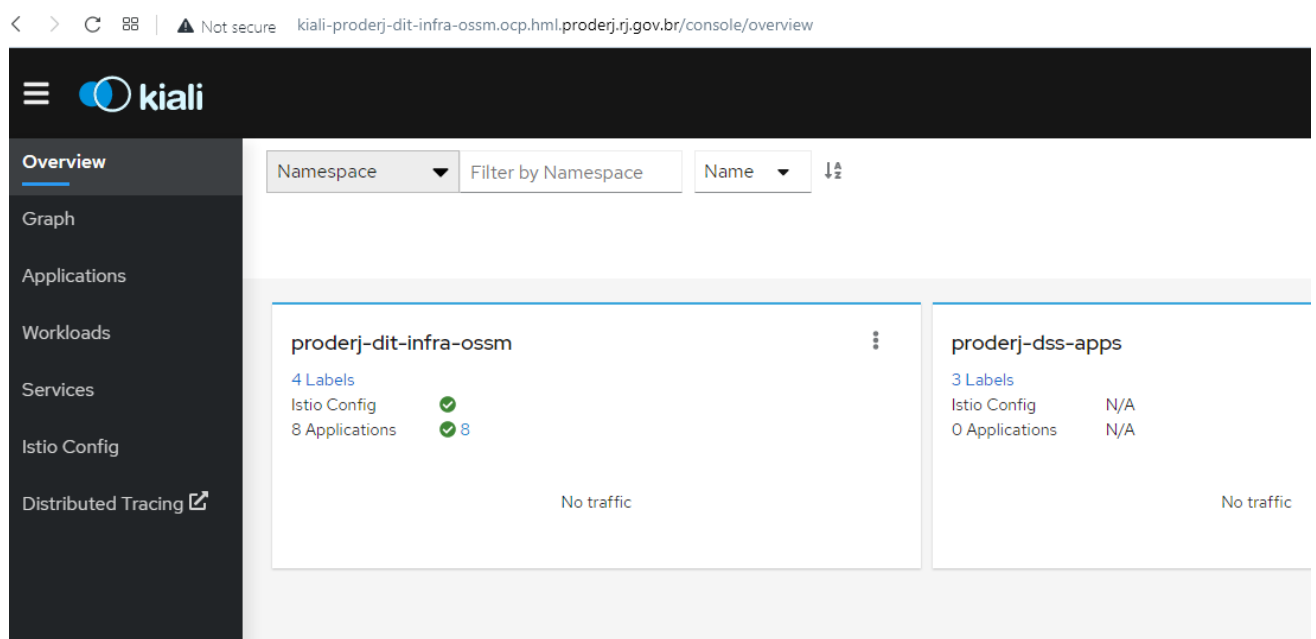
The screenshot shows the Red Hat OpenShift Container Platform console. The left sidebar contains navigation menus for Projects, Search, API Explorer, Events, Operators, Workloads, Networking, and Storage. The main content area displays the details of the ServiceMeshMemberRoll resource named 'default' in the 'proderj-dit-infra-ossm' namespace. The 'YAML' tab is selected, showing the following configuration:

```
1 apiVersion: maistra.io/v1
2 kind: ServiceMeshMemberRoll
3 metadata:
4   annotations:
5     meta.helm.sh/release-name: proderj-dit-infra-ossm
6     meta.helm.sh/release-namespace: proderj-dit-infra-oss
7   resourceVersion: '31583000'
8   name: default
9   uid: 48cd5dd9-8e4b-4746-b997-4010355c5389
10  creationTimestamp: '2022-04-07T13:21:08Z'
11  generation: 3
12  managedFields: ...
68  namespace: proderj-dit-infra-ossm
69  finalizers:
70    - maistra.io/istio-operator
71  labels:
72    app.kubernetes.io/managed-by: Helm
73  spec:
74    members:
75      - proderj-dss-apps
76  status:
```

On the right, a terminal window shows the command used to patch the resource:

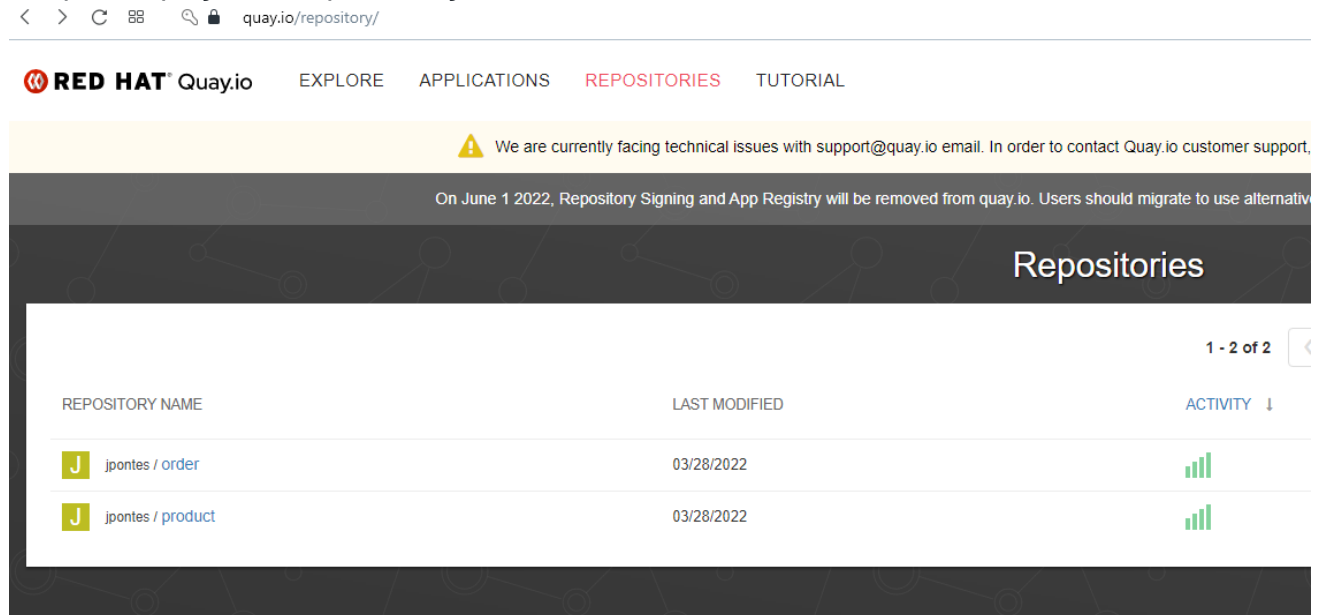
```
ocpadmin@SRV-CICC-OSHML-02:~/wks/RedHat-proderj/helm
[ocpadmin@SRV-CICC-OSHML-02 helm]$ oc -n=proderj-dit-infra-ossm patch servicemeshmemberroll/default '{"members": ["proderj-dss-apps"]}'
servicemeshmemberroll.maistra.io/default patched
[ocpadmin@SRV-CICC-OSHML-02 helm]$
```

Acessar: Browser >> Kiali



The screenshot shows the Kiali console interface. The left sidebar contains navigation menus for Overview, Graph, Applications, Workloads, Services, Istio Config, and Distributed Tracing. The main content area displays the 'Overview' tab, showing the Service Mesh configuration for the 'proderj-dit-infra-ossm' namespace. The 'proderj-dit-infra-ossm' namespace is selected, and the 'Filter by Namespace' dropdown is set to 'proderj-dit-infra-ossm'. The 'Name' dropdown is set to 'Labels'. The 'Labels' section shows 4 Labels, 8 Applications, and 8 Applications. The 'proderj-dss-apps' namespace is also shown, with 3 Labels, 0 Applications, and 0 Applications. The 'No traffic' status is displayed for both namespaces.

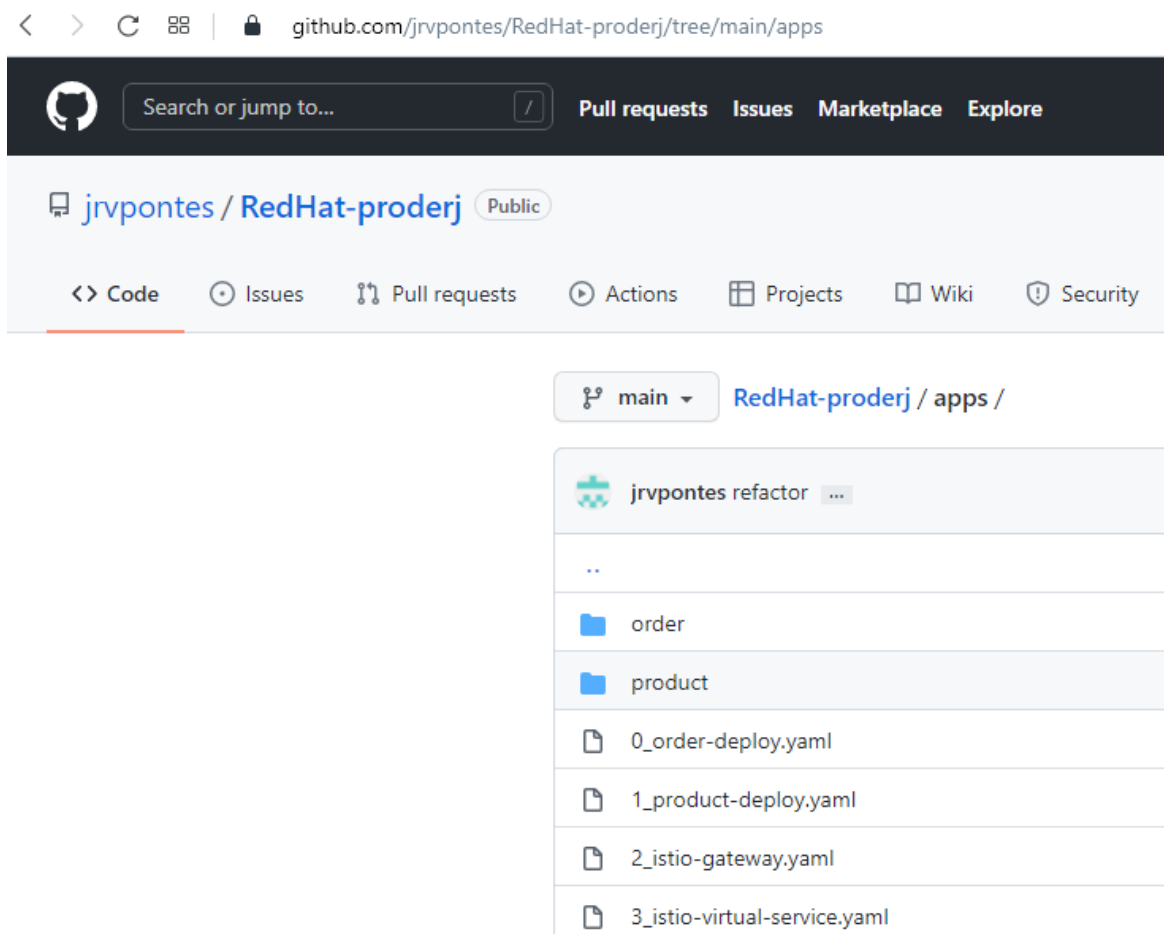
Com o service-mesh observando o projeto ‘proderj-dss-apps’, basta instalar as aplicações. As imagens dessas aplicações estão disponíveis no repositório: <https://quay.io/repository/>



The screenshot shows the Quay.io website interface. At the top, there's a navigation bar with 'RED HAT Quay.io', 'EXPLORE', 'APPLICATIONS', 'REPOSITORIES' (highlighted), and 'TUTORIAL'. Below the navigation bar, a yellow warning banner states: 'We are currently facing technical issues with support@quay.io email. In order to contact Quay.io customer support, On June 1 2022, Repository Signing and App Registry will be removed from quay.io. Users should migrate to use alternative...'. The main section is titled 'Repositories' and displays a table of repositories. The table has three columns: 'REPOSITORY NAME', 'LAST MODIFIED', and 'ACTIVITY'. Two repositories are listed: 'jpontes / order' and 'jpontes / product', both modified on '03/28/2022'. The activity column shows green bar charts. The page indicates '1 - 2 of 2' repositories.

REPOSITORY NAME	LAST MODIFIED	ACTIVITY
jpontes / order	03/28/2022	
jpontes / product	03/28/2022	

O código fonte e todos os arquivos necessários para a construção e publicação estão disponíveis na pasta **apps**:



The screenshot shows the GitHub repository page for 'jrvpontos / RedHat-proderj'. The repository is marked as 'Public'. The 'main' branch is selected. The file explorer shows the following structure:


- jrvpontos refactor ...
- ..
- order
- product
- 0_order-deploy.yaml
- 1_product-deploy.yaml
- 2_istio-gateway.yaml
- 3_istio-virtual-service.yaml

Para instalar as aplicações, executar:

```
helm install -f values.yaml -n proderj-dss-apps proderj-dss-apps  
helm-apps/
```

Acessar: web-console >> Workloads >> Pods >> proderj-dss-apps

< > C 88 | ⚠ Not secure console-openshift-console.ocp.html:proderj.rj.gov.br/k8s/ns/proderj-dss-apps/pods



Administrator

Home

Operators

OperatorHub

Installed Operators

Workloads

Pods

Deployments

DeploymentConfigs

StatefulSets

Secrets

ConfigMaps

Project: proderj-dss-apps

Pods

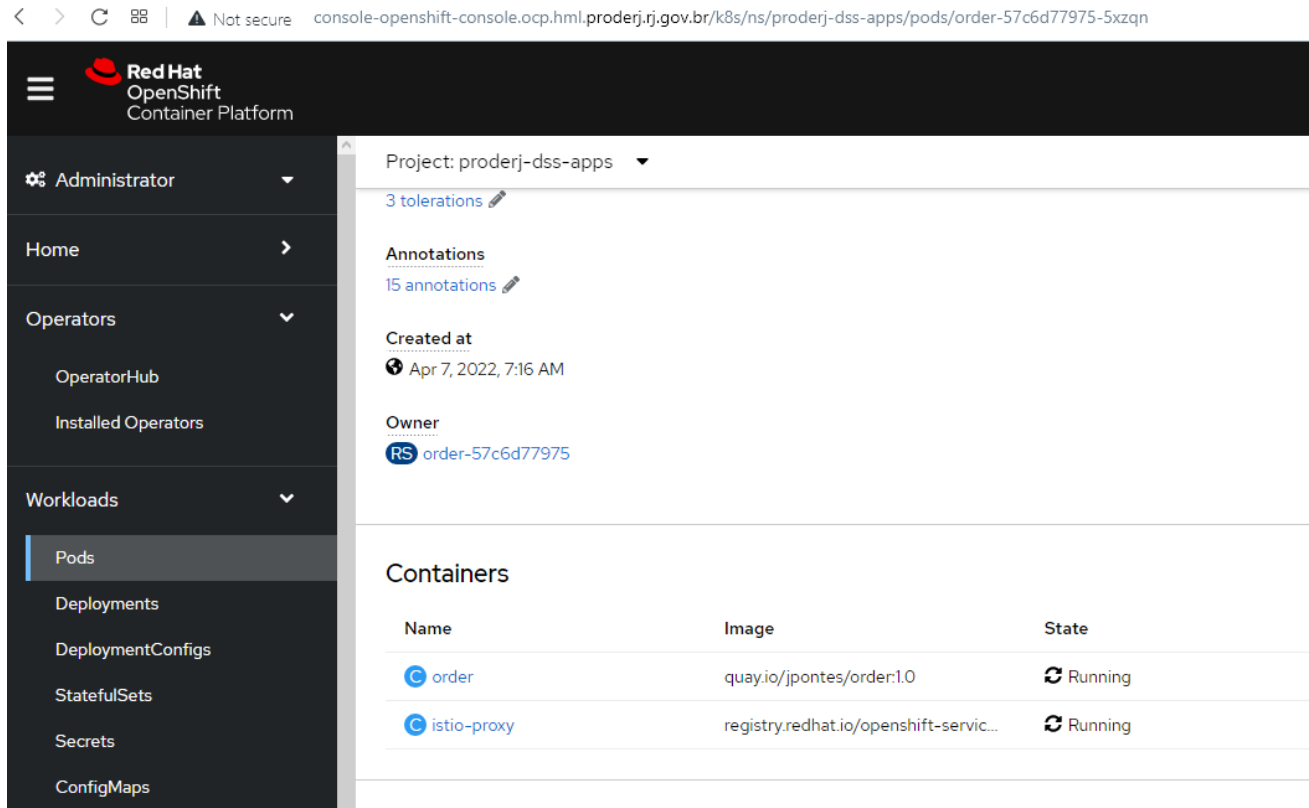
Filter Name Search by name...

Name ↑	Status ↓	Ready ↓	Restarts ↓	Owner ↓
order-57c6d77975-5xqzn	Running	2/2	0	order-57c6d77975
product-85ff585b7b-5dkvr	Running	2/2	0	product-85ff585b7b

```
ocpadmin@SRV-CICC-OSHML-02:~/wks/RedHat-proderj/helm  
[ocpadmin@SRV-CICC-OSHML-02 helm]$ helm install -f values.yaml -n proderj-dss-apps proderj-d  
WARNING: Kubernetes configuration file is group-readable. This is insecure. Location: /home/  
h/kubeconfig  
NAME: proderj-dss-apps  
LAST DEPLOYED: Thu Apr 7 11:16:29 2022  
NAMESPACE: proderj-dss-apps  
STATUS: deployed  
REVISION: 1  
TEST SUITE: None  
[ocpadmin@SRV-CICC-OSHML-02 helm]$
```

Conferindo a instalação do 'istio-sidecar'.

Acessar: web-console >> Workload >> Pods >> proderj-dss-apps >> order-xyz >> Containers



Project: proderj-dss-apps

3 tolerations

Annotations
15 annotations

Created at
Apr 7, 2022, 7:16 AM

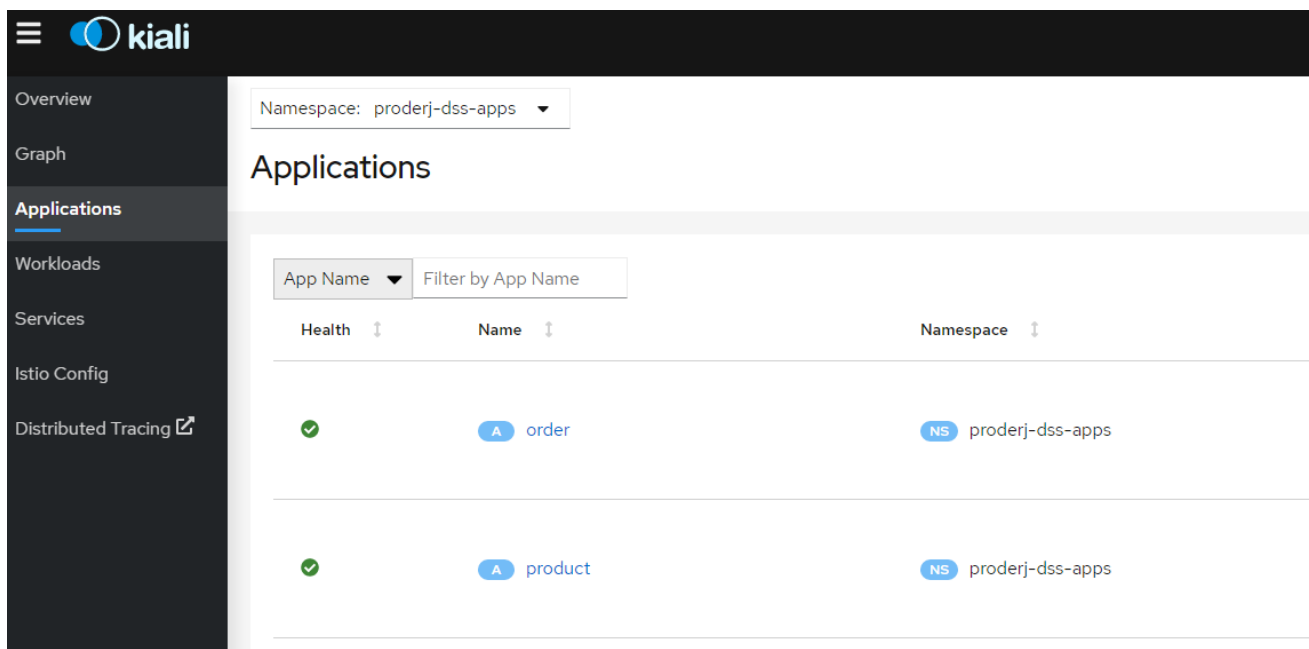
Owner
order-57c6d77975

Containers

Name	Image	State
order	quay.io/jpontes/order:1.0	Running
istio-proxy	registry.redhat.io/openshift-servic...	Running

Verificando se as aplicações já estão sendo observadas:

Acessar: Browser >> Kiali >> Applications



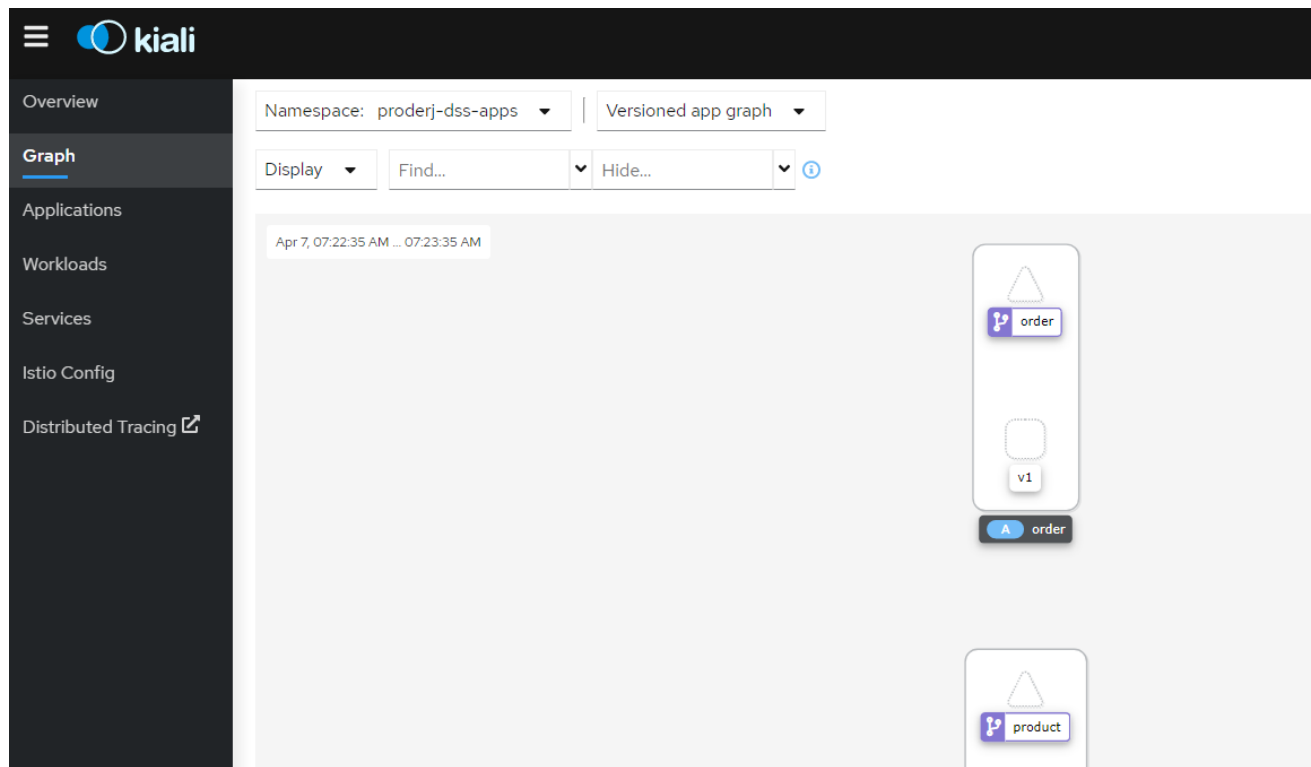
Namespace: proderj-dss-apps

Applications

App Name Filter by App Name

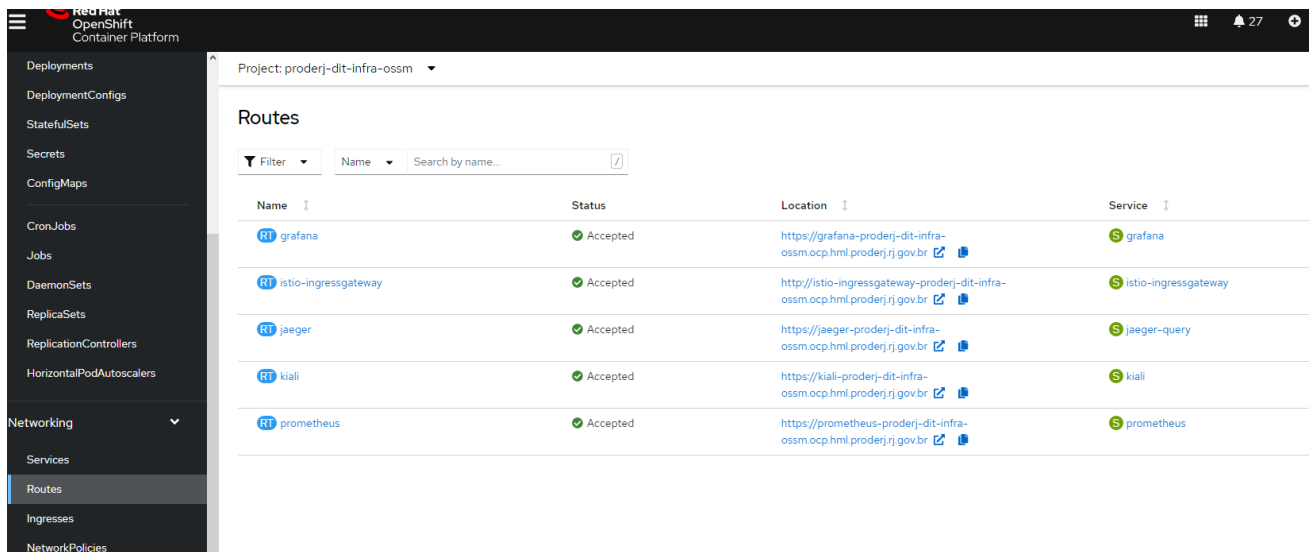
Health	Name	Namespace
✓	order	proderj-dss-apps
✓	product	proderj-dss-apps

Acessar: Browser >> Kiali >> Graph



Todos os aplicativos de exemplo, e os aplicativos de apoio a observabilidade estão disponíveis através de "Routes".

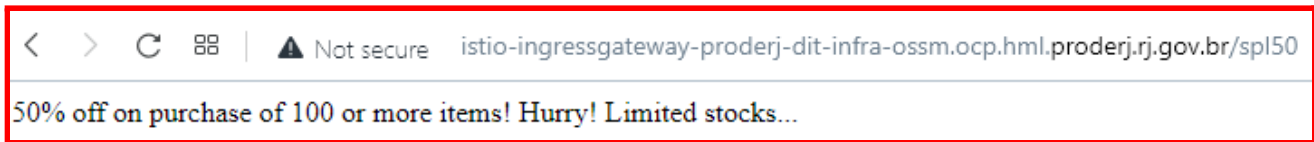
Acessar: web-console >> Networking >> Routes >> proderj-dit-infra-ossm



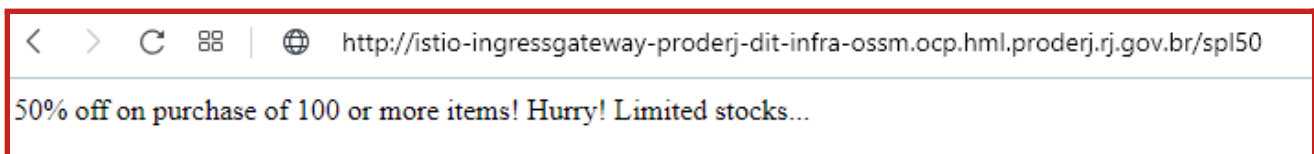
Name	Status	Location	Service
grafana	Accepted	https://grafana-proderj-dit-infra-ossm.ocp.html.proderj.rj.gov.br	grafana
istio-ingressgateway	Accepted	http://istio-ingressgateway-proderj-dit-infra-ossm.ocp.html.proderj.rj.gov.br	istio-ingressgateway
jaeger	Accepted	https://jaeger-proderj-dit-infra-ossm.ocp.html.proderj.rj.gov.br	jaeger-query
kiali	Accepted	https://kiali-proderj-dit-infra-ossm.ocp.html.proderj.rj.gov.br	kiali
prometheus	Accepted	https://prometheus-proderj-dit-infra-ossm.ocp.html.proderj.rj.gov.br	prometheus

Aplicativos de exemplo:

<http://istio-ingressgateway-proderj-dit-infra-ossim.ocp.html.proderj.rj.gov.br/order>

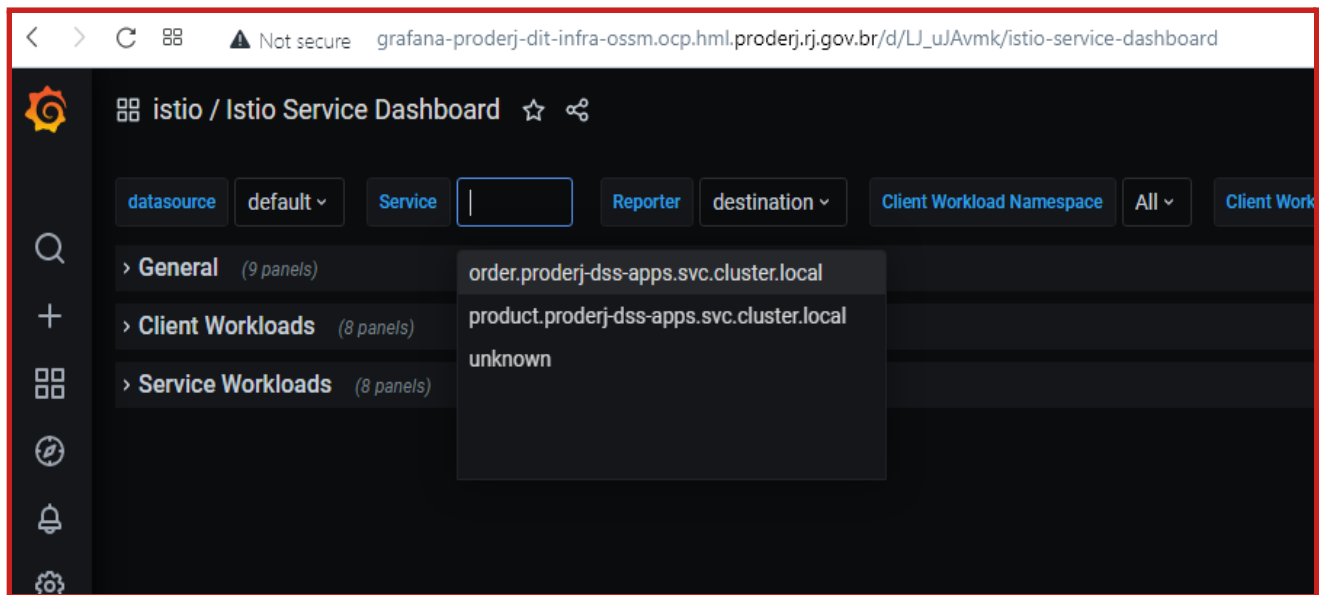


<http://istio-ingressgateway-proderj-dit-infra-ossim.ocp.html.proderj.rj.gov.br/spl50>

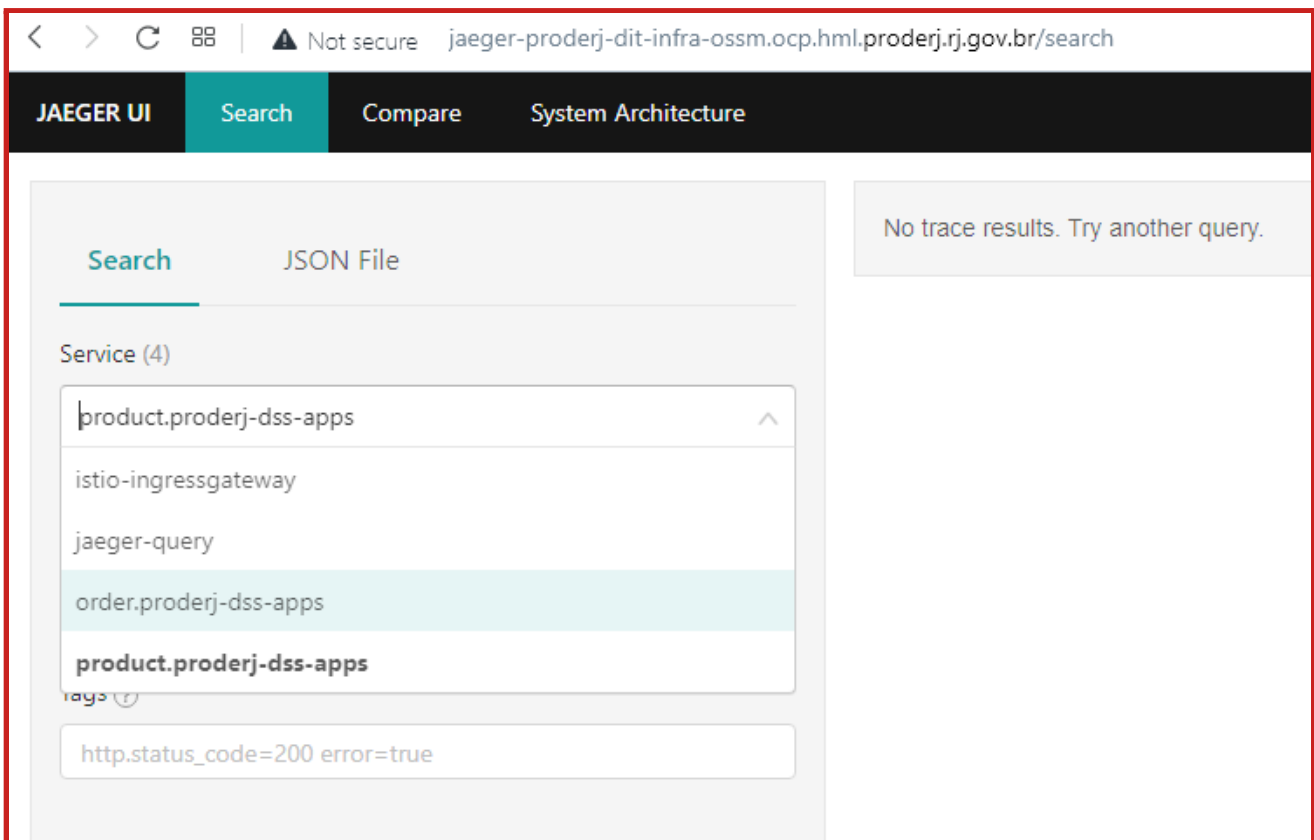


Aplicativos de apoio:

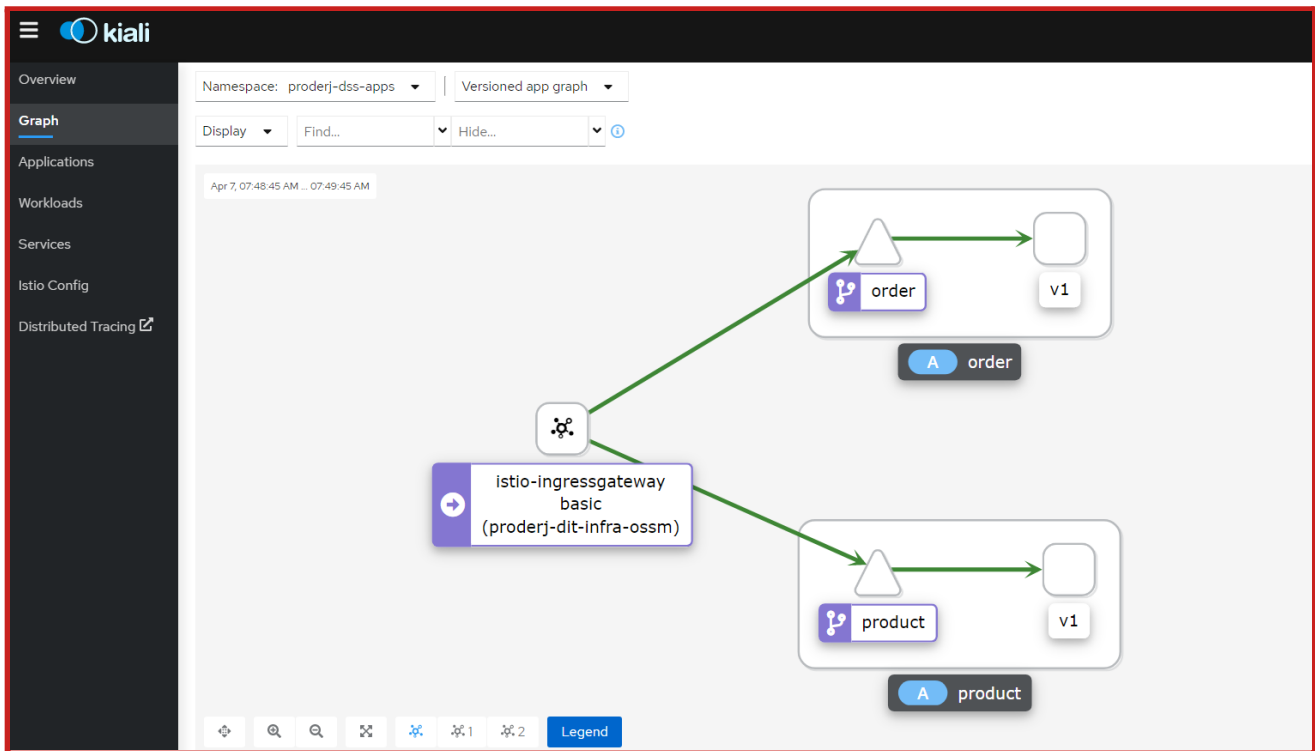
<https://grafana-proderj-dit-infra-ossm.ocp.hml.proderj.rj.gov.br/?orgId=1>



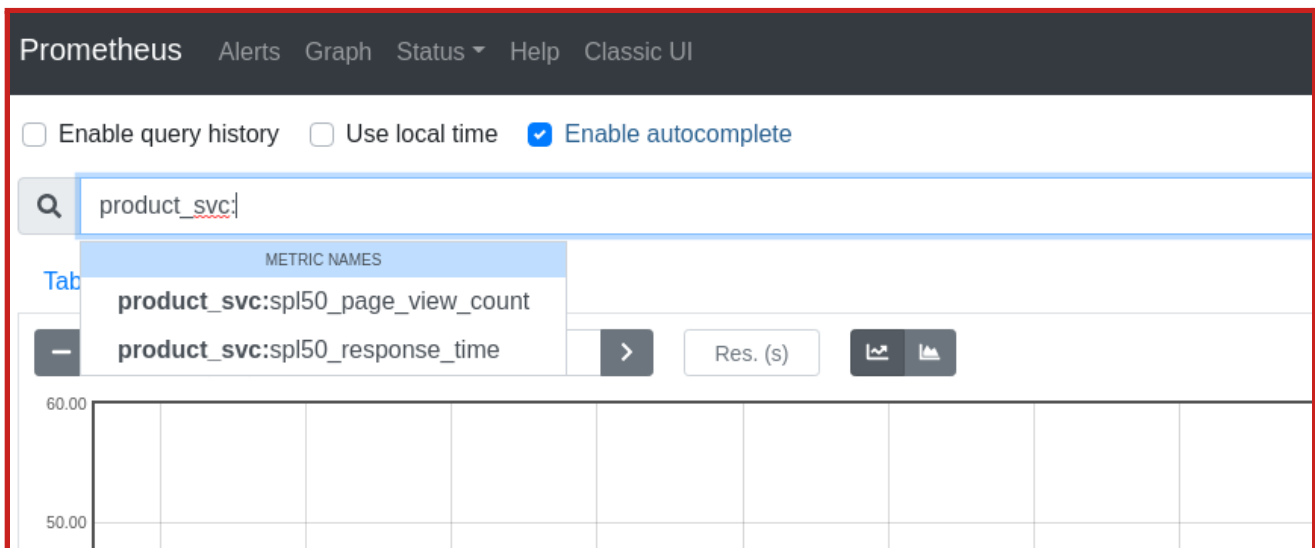
<https://jaeger-proderj-dit-infra-ossm.ocp.hml.proderj.rj.gov.br/search>



kiali-proderj-dit-infra-ossm.ocp.hml.proderj.rj.gov.br/console/overview



<https://prometheus-proderj-dit-infra-ossm.ocp.hml.proderj.rj.gov.br/graph>



Validação dos pré requisitos

https://access.redhat.com/documentation/en-us/openshift_container_platform/4.6/html-single/service_mesh#preparing-ossm-installation

Instalação do Operators

https://access.redhat.com/documentation/en-us/openshift_container_platform/4.6/html-single/service_mesh#installing-ossm

Implantação do Service Mesh Control Plane

https://access.redhat.com/documentation/en-us/openshift_container_platform/4.6/html-single/service_mesh#ossm-create-smcp

Criação de um Service Mesh Member Roll

https://access.redhat.com/documentation/en-us/openshift_container_platform/4.6/html-single/service_mesh#ossm-create-mesh

Observabilidade e Monitoramento

https://access.redhat.com/documentation/en-us/openshift_container_platform/4.6/html-single/service_mesh#ossm-observability

Referências

- 1 - Openshift Container Platform
https://access.redhat.com/documentation/en-us/openshift_container_platform/4.9/
- 2 - Red Hat Service Mesh
https://access.redhat.com/documentation/en-us/openshift_container_platform/4.9/html-single/service_mesh/index
- 3 - Jaeger
https://access.redhat.com/documentation/en-us/openshift_container_platform/4.9/html-single/service_mesh#understanding-jaeger
- 4 - Kiali
https://access.redhat.com/documentation/en-us/openshift_container_platform/4.9/html-single/service_mesh#understanding-kiali
- 5 - Metrics, logs, and traces
https://docs.openshift.com/container-platform/4.9/service_mesh/v2x/ossm-observability.html